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50X1

SPACE ELECTRONICS CORPORATION

Monthly Progress Report

Contract [redacted] 50X1

Period Ending 31 July 1960

1. During this period a conference was held with representatives of the contracting agency to discuss the scope of the work involved. It was agreed that the scope would be somewhat restricted over what was proposed in [redacted] Document P-44. 50X1 The following items have been deleted from the scope of the work:

   a. Paragraph C-1 on Page 3 entitled, "Surface Waves".
   b. Paragraph 6 on Page 8 which refers to other types of communications systems.
   c. Paragraph 7 on Page 9 titled, "Conventional Radio".

   The effort will be confined to a study of the conducting sheet, the layering, the seismic wave propagation, acoustic propagation, and the modulation techniques.

   It was also agreed that an output of the study should be a set of trade-off curves giving data on required power and weight for communications over the specified distances for the various techniques.

2. Preliminary computations have been made for earth current communication. It was assumed that the electrodes would consist of driven stakes spaced on the order of 100 meters (existing water pipes or other buried conduction could be used if available). With about 150 lbs. (total) of equipment, including batteries, communication can be carried out at ranges up to about 100 miles in the extremely low frequency range, depending on noise condition and data rates required. Present noise estimates indicate that a 5WPM capability at 100 miles would be possible using such equipment. Higher data rates are possible at shorter ranges. Efficiency is affected by soil condition and the subsurface geologic structure. The indicated weight of equipment includes batteries and a rectifier for recharging from a power line. The batteries were chosen for a minimum weight for a 15-minute communication duty cycle, and can be recharged about 25 times.

   Future work will determine the ranges and data rates possible with more portable equipment (less than 150 lbs.). Also the dependence of noise on frequency will be investigated to determine optimum frequencies to be used for such communication.

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